

What is claimed is:

1                   1.     A tibial augment for use with a knee joint prosthesis, comprising:

2                   an annular member with a proximal surface, a distal surface, an outer  
3     anterior surface, an inner anterior surface, an outer posterior surface, an inner posterior  
4     surface, an inner lateral surface, an outer lateral surface, an inner medial surface and  
5     an outer medial surface;

6                   said outer lateral surface being curved to define a continuous surface  
7     connecting said outer posterior surface and said outer anterior surface;

8                   said outer medial surface being curved to define a continuous surface  
9     connecting said outer posterior surface and said outer anterior surface;

10                  said outer anterior surface being a slightly curved surface; and

11                  said outer posterior surface being a generally planer surface.

1                   2.     The tibial augment defined in Claim 1, wherein said annular

2     member is sized to fit, at least partially, within a cavity formed in a proximal portion  
3     of a human tibia.

1                   3.     The tibial augment defined uniform thickness, whereby each

2     outer surface of said substantially uniform in Claim 1, wherein at least a majority  
3     portion of said annular member is of a substantially thickness majority portion is  
4     spaced a substantially constant distance from each associated inner surface.

1           4.     The tibial augment defined in Claim 3, wherein said inner  
2     anterior surface includes a distal/proximal extending channel therein, thereby defining  
3     a reduced thickness portion.

1           5.     The tibial augment defined in Claim 4, wherein said majority  
2     portion of a substantially uniform thickness is approximately 5mm thick and said  
3     reduced thickness portion is approximately 3mm thick at the narrowest point thereof.

1           6.     The tibial augment defined in Claim 1, wherein said inner  
2     anterior surface includes a distal/proximal extending channel therein, thereby defining  
3     a reduced thickness portion.

1           7.     The tibial augment defined in Claim 1, wherein said annular  
2     member is composed of a tantalum based porous metal.

1           8.     The tibial augment defined in Claim 1, wherein said outer  
2     posterior surface has a distal taper of less than approximately 17°.

1           9.     The tibial augment defined in Claim 1, wherein said outer medial  
2     surface and said outer lateral surface each have a distal taper of between  
3     approximately 8° and approximately 30°.

1                   10. The tibial augment defined in Claim 1, wherein said outer  
2 anterior surface has essentially no distal taper.

1                   11. The tibial augment defined in Claim 1, further comprising a  
2 stepped distal surface, thereby defining a first distal surface and a second distal surface  
3 with a transition surface therebetween, wherein said first distal surface is located at a  
4 greater distance from said proximal surface than said second distal surface.

1                   12. The tibial augment defined in Claim 11, wherein said transition  
2 surface is located midway between said outer lateral surface and said outer medial  
3 surface.

1                   13. The tibial augment defined in Claim 11, wherein said transition  
2 surface is located closer to said outer lateral surface than to said outer medial surface.

1                   14. The tibial augment defined in Claim 11, wherein said transition  
2 surface is located closer to said outer medial surface than to said outer lateral surface.

1                   15. The tibial augment defined in Claim 1, wherein said annular  
2 member is composed of a material that is substantially transparent to provide an  
3 indication of bony contact when said annular member is used as a provisional.

1           16.    The tibial augment defined in Claim 1, wherein said annular  
2   member is made of a photo-elastic material that provides an indication of bony contact  
3   when said annular member is used as a provisional.

1           17.    The tibial augment defined in Claim 1, further comprising at least  
2   one set of generally lateral/medial extending grooves formed on at least two opposing  
3   inner surfaces of said annular member to facilitate insertion and removal of the tibial  
4   augment when used as a provisional.

1           18.    The tibial augment defined in Claim 17, wherein said at least one  
2   set of generally lateral/medial extending grooves are formed on said inner lateral  
3   surface and said inner medial surface; and further wherein said annular member is  
4   composed of a material that is substantially transparent.

1           19.    An implant system for use with a knee joint prosthesis, said  
2   implant system comprising:

3                a plurality of differently-sized tibial augments, wherein each said tibial  
4   augment is an annular member that is substantially shaped as a truncated cone with a  
5   generally oblongated oval cross-section that is symmetric about its minor axis, each of  
6   said annular members being sized to fit within a cavity of a corresponding size formed  
7   in a proximal portion of a human tibia of an appropriate size.

1                   20.    The implant system as defined in Claim 19, further comprising:  
2                   a plurality of differently-sized tibial augment pushers, with at least one  
3   pusher configured for use with each size of tibial augment, said pushers being  
4   configured and arranged for implanting each of said differently-sized tibial augments  
5   within a human tibia

1                   21.    The implant system as defined in Claim 20, wherein at least one  
2   pusher of said plurality of pushers is configured for use with more than one size of  
3   said differently sized tibial augments.

1                   22.    The implant system as defined in Claim 20, wherein each of said  
2   pushers includes:  
3                   a handle portion; and  
4                   an augment seating portion, connected to one end of said handle portion,  
5   wherein said augment seating portion is configured and arranged to seat a tibial  
6   augment of at least one particular size.

1                   23.    The implant system as defined in Claim 19, further comprising:  
2                   a plurality of differently-sized guides, with one guide being configured  
3   for use with each size of tibial augment; and  
4                   a plurality of osteotomes configured and arranged to cooperate with each  
5   of said guides, said osteotomes and said guides being configured and arranged to

6 create an appropriately sized cavity within a proximal portion of a human tibia for  
7 implanting an appropriately sized tibial augment therein.

1           24. The implant system as defined in Claim 19, further comprising:  
2           a plurality of differently-sized provisional tibial augments, with one of  
3 said provisional tibial augments corresponding in size and shape to each of said tibial  
4 augments, and each of said provisional tibial augments being composed of a material  
5 that is substantially transparent.

1           25. The implant system as defined in Claim 24, wherein:  
2           each of said provisional tibial augments includes a plurality of grooves  
3 on a plurality of inner surfaces thereof;  
4           a plurality of differently-sized holders, configured for use with said  
5 provisional tibial augments, each of said holders including a plurality of ribs, with  
6 each of said ribs being configured and arranged to correspond to one of said grooves  
7 on said provisional tibial augment, such that an appropriately sized one of said holders  
8 is capable of holding one of said provisional tibial augments during removal of said  
9 provisional tibial augment from a cavity formed within a proximal portion of a human  
10 tibia.

1                   26.     A method of correcting for tibial defects during knee  
2 replacement surgery:  
3                   preparing an existing cavity, or creating a cavity in a proximal portion of  
4 a human tibia;  
5                   inserting a tibial augment within said cavity; and  
6                   attaching a tibial portion of a knee joint prosthesis to said tibial augment.

1                   27.     The method of correcting for tibial defects, as defined in Claim  
2 26, further comprising the step of:  
3                   selecting an appropriately sized tibial augment from a group of  
4 differently sized tibial augments.

1                   28.     The method of correcting for tibial defects, as defined in Claim  
2 26, wherein:  
3                   during said step of preparing or creating said cavity, a guide and a set of  
4 osteotomes are utilized to form said cavity, said guide including a slot with different  
5 portions thereof configured for accepting different osteotomes of said set of  
6 osteotomes.

1                   29.     The method of correcting for tibial defects, as defined in Claim  
2 26, further comprising the step of inserting a second tibial augment within said cavity,  
3 wherein said second tibial augment is stacked upon said tibial augment originally  
4 inserted within said cavity.

1                   30.    The method for correcting for tibial defects, as defined in Claim  
2   26, wherein prior to said step of inserting a tibial augment within said cavity, a  
3   provisional tibial augment is temporarily inserted into said cavity.

1                   31.    The method for correcting for tibial defects, as defined in Claim  
2   30, further comprising the step of using said provisional tibial augment as a tamp to  
3   tamp a bone graft into position.

1                   32.    A pusher for use with a tibial augment, said pusher comprising:  
2                   a handle portion; and  
3                   an augment seating portion, connected to one end of said handle portion,  
4   wherein said augment seating portion is configured and arranged to seat at least one  
5   particularly sized tibial augment.

1                   33.    The pusher as defined in Claim 32, wherein:  
2                   said augment seating portion includes a head portion and a platform  
3   portion, which are attached together, and wherein said platform portion is attached to  
4   said handle portion of said pusher;

5                   said platform portion including a generally planar surface at an interface  
6   between said platform portion and said head portion; and

7                   said head portion including a plurality of tapered surfaces, such that a  
8   cross-section of said head portion decreases with increasing distance from said  
9   generally planar surface of said head portion.



1                   34.     An osteotome used for creating a cavity in a bone, said osteotome  
2     comprising:  
3                   a handle portion; and  
4                   a cutting portion attached to said handle portion, wherein said cutting  
5     portion includes:  
6                   a tapered edge at a distal end thereof;  
7                   at least one stop for hindering penetration of said cutting portion into  
8     said bone past a predetermined distance.

1                   35.     The osteotome as defined in Claim 34, wherein said at least one  
2     stop includes two stops, with one of said stops being configured for hindering  
3     penetration of said cutting portion into said bone past a first predetermined distance  
4     and with the other one of said stops being configured for hindering penetration of said  
5     cutting portion into said bone past a second predetermined distance.

1                   36.     The osteotome as defined in Claim 35, wherein:  
2                   one of said stops is configured to cooperate with a guide of a first size  
3     and the other of said stops is configured to cooperate with a guide of a second size,  
4     where said second size is different from said first size.

1                   37.    The osteotome as defined in Claim 34, wherein said cutting  
2   portion is curved into an arc shape.

1                   38.    The osteotome as defined in Claim 35, wherein:  
2                   said cutting portion is generally planar, with said plane defined by said  
3   generally planar cutting portion being situated at an oblique angle with respect to a  
4   longitudinal axis of said handle portion.

1                   39.    The osteotome as defined in Claim 35, wherein said osteotome is  
2   configured and sized to create a cavity in a proximal portion of a human tibia.

1                   40.    A guide for use with at least one osteotome when creating a  
2   cavity in a bone, said guide comprising:

3                   an upper surface;

4                   a generally planar lower surface;

5                   a generally C-shaped slot extending from said upper surface to said  
6   generally planar lower surface; and

7                   a securing arrangement to secure said guide to the bone within which the  
8   cavity is being created, said securing arrangement securing said guide such that said  
9   generally planar lower surface faces the bone within which a cavity is being created.

1           41. The guide as defined in Claim 40, wherein said securing  
2 arrangement includes:

3           an aperture with a central axis extending in a direction generally  
4 perpendicular to said generally planar lower surface, wherein said aperture is  
5 configured to accept an intramedullary rod.

1           42. The guide as defined in Claim 41, wherein said securing  
2 arrangement further includes:

3           a threaded hole extending in a direction generally transverse to said  
4 plane of said generally planar lower surface; and

5           a setscrew configured to extend through said threaded hole and to  
6 contact the intramedullary rod such that said guide is retained in position with respect  
7 to the intramedullary rod within said aperture.

1           43. The guide as defined in Claim 41, wherein said aperture is  
2 generally triangular-shaped, and said aperture extends completely through said guide  
3 from said generally planar lower surface to said upper surface.

1           44. The guide as defined in Claim 40, wherein portions of said  
2 generally C-shaped slot are tapered inwardly toward said generally planar lower  
3 surface.

1           45. A system used for creating a cavity in a proximal portion of a  
2 human tibia for use prior to implanting a knee joint prosthesis, said system comprising:  
3           a guide that includes:  
4                 an upper surface;  
5                 a lower surface;  
6                 a generally C-shaped slot extending from said upper surface to  
7 said lower surface; and  
8                 a securing arrangement to secure said guide to the bone within  
9 which the cavity is being created, said securing arrangement securing said guide such  
10 that said lower surface faces the bone within which the cavity is being created; and  
11           a set of osteotomes configured and arranged to be inserted within said  
12 generally C-shaped slot of said guide.

1           46. The system according to Claim 45, wherein each of said  
2 osteotomes within said set includes at least one stop for hindering penetration of a  
3 cutting portion of said osteotome into said bone past a predetermined distance by  
4 contacting a surface of said upper surface of said guide adjacent to said C-shaped  
5 slot.

1           47. The system as defined in Claim 46 wherein said at least one stop  
2 on each of said osteotomes within said set includes two stops, with one of said stops  
3 being configured for hindering penetration of said cutting portion into said bone past a  
4 first predetermined distance and with the other one of said stops being configured for

5 hindering penetration of said cutting portion into said bone past a second  
6 predetermined distance.

1 48. A holder for inserting and/or removing a provisional augment  
2 to/from a cavity in a bone, said holder comprising:

3 a body portion defining a longitudinal axis;

4 a pair of legs extending from said body portion;

5 a finger connected to each of said legs; and

6 a rib extending outwardly from each of said fingers, each of said ribs  
7 extending in a direction generally perpendicular to said longitudinal axis of said body  
8 portion, wherein said ribs are configured and arranged to correspond to grooves on an  
9 inner surface of a provisional augment.

1 49. The holder as defined in Claim 48, further comprising a pair of  
2 stops configured and arranged to be seated upon a proximal surface of the provisional  
3 augment, whereby said stops serve as locators for properly locating said ribs of said  
4 holder with respect to the grooves of the provisional augment.

1 50. The holder as defined in Claim 48, wherein said pair of legs  
2 comprises a pair of flexible legs, such that application of a force upon outer surfaces  
3 of said legs allows for said ribs to be disengaged from the grooves on the inner surface  
4 of the provisional augment without significantly altering the location of the provision  
5 augment.

1           51.    The holder as defined in Claim 48, wherein:  
2                each of said legs is a relatively rigid member; and  
3                each of said fingers is attached to one of said legs such that said fingers  
4   are movable with respect to said legs, whereby movement of said fingers with respect  
5   to said legs allows for said ribs to be disengaged from the grooves on the inner surface  
6   of the provisional augment without significantly altering the location of the provision  
7   augment.

1           52.    The holder as defined in Claim 51, wherein a distance between  
2   said fingers is adjustable to permit said holder to be used with provisional augments of  
3   different sizes.

1           53.    The holder as defined in Claim 51, wherein said fingers are  
2   attached to said legs via a threaded shaft that is threaded in one direction where one of  
3   said fingers is connected thereto and in an opposite direction where the other of said  
4   fingers is connected thereto, whereby when said threaded shaft is rotated in a first  
5   direction with respect to said legs, said fingers are moved towards each other and  
6   when said threaded shaft is rotated in an opposite direction with respect to said legs,  
7   said fingers are moved away from each other.

1           54.    The holder as defined in Claim 51, further comprising:  
2                a threaded shaft that extends from one of said legs to the other of said  
3   legs and is rotatable with respect to said legs and connects said fingers to said legs,

4 said threaded shaft being threaded in one direction where one of said fingers is  
5 connected thereto and in an opposite direction where the other of said fingers is  
6 connected thereto; and

7 a secondary shaft that extends from one of said legs to the other of said  
8 legs, with said fingers being movably attached thereto.

1 55. The holder as defined in Claim 54, wherein said secondary shaft  
2 includes a slight taper from a center thereof outwardly towards each of said legs.